Amendments to the Claims:

The listing of claims will replace all prior versions and listings of claims in the application:

Listing of Claims:

Please cancel claims 1-25, and add the following new claims:

1.-25. (cancelled)

26. (new) A system for providing a constant flow of gas into a vacuum processing chamber irrespective of fluctuations in pressure of a supply gas, comprising:

a mass flow controller comprising a mass flow sensor, including a sensor bypass, configured to sense the flow of the supply gas into an inlet of the controller, and a control valve for use in controlling the rate of flow of gas through an outlet of the valve;

a pressures sensor configured to sense the gas pressure in a volume between the mass flow sensor bypass and the control valve; and

an electronic controller configured to monitor the pressure sensed by said pressure sensor and to compensate the sensed inlet flow rate sensed by said mass flow sensor to thereby ensure substantially constant flow of gas from an outlet of the control valve irrespective of fluctuations in pressure of the supply gas.

27. (new) The system of claim 26, wherein the mass flow sensor is a thermal mass flow sensor.

28. (new) The system of claim 26, further comprising:

a temperature sensor configured to sense the temperature of gas within the volume between the sensor bypass and the control valve and to provide a temperature signal

indicative of the sensed temperature, wherein the electronic controller configured to employ the temperature signal in producing the substantially constant flow of gas from an outlet of the control valve.

29. (new) The system of claim 28, wherein the temperature sensor is configured to sense the temperature of a wall that defines a portion of the volume between the sensor bypass and the control valve, wherein the temperature signal is a function of the sensed temperature.

30. (new) The system of claim 29, wherein the electronic controller is configured to compute the time rate of change of pressure within the volume between the sensor bypass and the outlet control valve, and to use this time rate of change of pressure to produce the compensated measure of the rate of fluid flow out of the controller.

31. (new) The system of claim 30, wherein the electronic controller is configured to compare the compensated measure of the rate of fluid flow out of the controller to a set value and to adjust the outlet control valve to minimize the difference between the set value and the compensated measure of the rate of fluid flow out of the controller so as to ensure substantially constant flow of gas from an outlet of the control valve irrespective of fluctuations in pressure of the supply gas.

32. (new) The system of claim 30, wherein the electronic controller is configured to compensate the controller's sensed inlet flow rate by subtracting from the sensed inlet

flow rate the product of: a normalized rate of pressure change within the volume between the sensor bypass and the control valve, a normalized temperature of the fluid within that volume, and the volume between the bypass sensor and the outlet control valve.

33. (new) The system of claim 30, wherein the electronic controller is configured to compensate the controller's sensed inlet flow rate by subtracting from it the product of a constant, the volume between the sensor bypass and the outlet control valve, and the time rate of pressure change within the volume between the sensor bypass and the outlet control valve, divided by the temperature of the fluid within the volume.

34. (new) A system for providing a constant flow of gas into a vacuum processing chamber irrespective of fluctuations in pressure of a supply gas, comprising:

a mass flow controller configured to control the flow of the supply gas through the mass flow controller and defining a volume between a mass flow sensor bypass and a control valve;

a pressure sensor configured to sense the gas pressure in the volume; and

an electronic controller configured to monitor the pressure sensed by said pressure sensor and to compensate the sensed inlet flow rate sensed by said mass flow sensor to thereby ensure substantially constant flow of gas from an outlet of the control valve irrespective of fluctuations in pressure of the supply gas.

35. (new) A method of providing a constant flow of gas into a vacuum processing chamber irrespective of fluctuations in pressure of a supply gas, comprising:

sensing the flow of the supply gas through a mass flow controller comprising a mass flow sensor, including a sensor bypass, configured to sense the flow of the supply gas into an inlet of the controller, and controlling with a control valve the rate of flow of gas through an outlet of the valve;

sensing with a pressures sensor the gas pressure in a volume between the mass flow sensor bypass and the control valve; and

using an electronic controller to monitor the pressure sensed by said pressure sensor and to compensate the sensed inlet flow rate sensed by said mass flow sensor to thereby ensure substantially constant flow of gas from an outlet of the control valve irrespective of fluctuations in pressure of the supply gas.

36. (new) The method of claim 35, wherein sensing the flow of supply gas includes sensing the flow of supply gas with a thermal mass flow sensor.

37. (new) The method of claim 35, further comprising:

sensing the temperature of gas within the volume between the sensor bypass and the control valve and providing a temperature signal indicative of the sensed temperature, and configuring the electronic controller so as to employ the temperature signal in producing the substantially constant flow of gas from an outlet of the control valve.

38. (new) The method of claim 37, wherein sensing the temperature of gas within the volume includes sensing the temperature of a wall that defines a portion of the volume between the sensor bypass and the control valve, wherein the temperature signal is a function of the sensed temperature.

39. (new) The method of claim 38, configuring the electronic controller includes configuring the electronic controller to compute the time rate of change of pressure within the volume between the sensor bypass and the outlet control valve, and using this time rate of change of pressure to produce the compensated measure of the rate of fluid flow out of the controller.

40. (new) The method of claim 39, wherein configuring the electronic controller includes configuring the electronic controller to compare the compensated measure of the rate of fluid flow out of the controller to a set value and adjusting the control valve to minimize the difference between the set value and the compensated measure of the rate of fluid flow out of the controller so as to ensure substantially constant flow of gas from an outlet of the control valve irrespective of fluctuations in pressure of the supply gas.

41. (new) The method of claim 39, wherein configuring the electronic controller includes configuring the controller so as to compensate the controller's sensed inlet flow rate by subtracting from the sensed inlet flow rate the product of: a normalized rate of pressure change within the volume between the sensor bypass and the control valve, a

normalized temperature of the fluid within that volume, and the volume between the bypass sensor and the outlet control valve.

42. (new) The method of claim 39, wherein configuring the electronic controller includes configuring the controller so as to compensate the controller's sensed inlet flow rate by subtracting from it the product of a constant, the volume between the sensor bypass and the outlet control valve, and the time rate of pressure change within the volume between the sensor bypass and the outlet control valve, divided by the temperature of the fluid within the volume.

43. (new) A method of providing a constant flow of gas into a vacuum processing chamber irrespective of fluctuations in pressure of a supply gas, comprising:

configuring a mass flow controller so as to control the flow of the supply gas through the mass flow controller and define a volume between a mass flow sensor bypass and a control valve;

configuring a pressure sensor so as to sense the gas pressure in the volume; and

configuring an electronic controller so as to monitor the pressure sensed by said pressure sensor and to compensate the sensed inlet flow rate sensed by said mass flow sensor to thereby ensure substantially constant flow of gas from an outlet of the control valve irrespective of fluctuations in pressure of the supply gas.